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09/585,980	06/02/2000	Lizhi Wang	80398.P322	5683

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EXAMINER	
HESSELTINE, RYAN J	

ART UNIT	PAPER NUMBER
2623	11

DATE MAILED: 04/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/585,980	Applicant(s) WANG, LIZHI	
	Examiner Ryan J Hesseltine	Art Unit 2623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 January 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-45* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-45* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 January 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments on page 11, first paragraph, filed January 26, 2004, with respect to Figure 7 have been fully considered and are persuasive. The objection of Figure 7 has been withdrawn.

2. Applicant's arguments on page 11, third paragraph, filed January 26, 2004, with respect to claim 34 have been fully considered and are persuasive. The 35 U.S.C. 112, 2nd paragraph rejection of claim 34 has been withdrawn.

3. Applicant's arguments on pages 11-13, filed January 26, 2004, with respect to Kinjo in view of Cosatto have been fully considered but they are not persuasive. Page 11, last paragraph states, "the examiner states that neither Kinjo nor Cosatto disclose performing a logical AND on said first area and said second area, as recited in claims 1, 23, 34, and 45. Instead the Examiner is taking Official Notice of this missing element." The examiner respectfully disagrees. The examiner has not taken Official Notice of the logical AND operation. The only place the words "Official Notice" appear in the previous Office Action is at paragraph 14 regarding claims 3, 5, 14, 16, 25, 27, 36, and 38 with respect to the fact that determining thresholds by normalization is well known in the art (also listed below). The examiner realizes that neither Kinjo nor Cosatto explicitly recite the words "logical AND," but Cosatto clearly shows the use of shape and color channels to produce a list of areas which may contain head outlines and facial features wherein objects are located using information obtained from several channels to evaluate the quality of individual features **as well as combinations of features** including shape, color, and motion (column 5, line 47-54). Also, Cosatto discloses that the use of multiple algorithms or classifiers,

wherein several different classifiers evaluate an object independently and are then **combined** in a final step, increases the accuracy of the tracked output, extracts enhanced detail from the collected images, and increases the robustness of the tracked output, which is an improvement over that of simple color segmentation (column 2, line 8-28). The examiner believes that the essence of applicant's invention lies in determining areas of low color gradient, determining areas of high intensity, and determining areas that have both, as recited in claim 12 where there is no mention of a logical AND operation. In other words, finding the **combination** of areas having both low color gradient and high intensity, and finally selecting portions of the combined areas with suitable hue saturation to form a candidate patch for a face. The examiner believes that Cosatto discloses the claimed combination of features (which is effectively equivalent to the logical AND operation). The examiner has cited additional references that disclose the claimed logical AND operation (see attached form PTO-892 and included references).

Drawings

4. The drawings were received on January 26, 2004. These drawings are acceptable.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-5, 8, 12-16, 19, 23-27, 30, 34-38, 41, and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kinjo (USPN 5,629,752, previously cited) in view of Cosatto et al. (USPN 5,864,630, previously cited, "Cosatto").

7. Regarding claims 1, 23, and 45, Kinjo discloses an apparatus and method of determining at least one candidate patch for human faces in a color graphic image (column 19, line 18-25), comprising: determining a first area of the color graphic image wherein a color gradient (changing differential values) has a low value (exclude the regions in which differential values change regularly; column 18, line 65 to column 19, line 17); determining a second area of the color graphic image (white region) wherein an intensity value has a high value (corresponding to a low pixel density value; column 17, line 33-42).

8. Kinjo does not disclose performing a logical AND on said first area and said and second areas to determine a third area of the color graphic image, or selecting portions of the third area with suitable hue saturation to form said at least one candidate patch. Cosatto discloses a multi-modal method for locating objects in images using information obtained from several channels to evaluate the quality of individual features, as well as combinations of features including shape, color, and motion (column 5, line 47-54). It is also disclosed that the data produced by each channel comprises a list of areas which may contain head outlines and facial features (column 5, line 66-column 6, line 2), which are compared, evaluated, and integrated by a classifier which assigns a measure of confidence for each feature and each combination of features to determine which channel or combination should be used to arrive at the final result (column 6, line 20-34). While Cosatto does not explicitly disclose that a logical AND is performed on a first area and a second area to determine a third area of the color graphic image, it is disclosed that areas from each feature channel are compared, evaluated, and integrated such that areas with the desired features are found having the combined features (column 6, line 58-66). Cosatto further discloses that an area with suitable hue saturation (skin color) is selected to form at least one

candidate patch (column 13, line 14-29). It would have been obvious to one of ordinary skill in the art at the time the invention was made to locate objects in images using areas found using combined results ("logical AND") from several feature channels and selecting areas with suitable hue saturation to form at least one candidate patch as taught by Cosatto in order to enable a tracking system to extract enhanced detail from the collected images thereby improving the accuracy and robustness of the tracked output over that of simple color segmentation as well as providing information to the tracking system which may be used to train the system for subsequent tracking (column 2, line 8-28).

9. Regarding claim 12, Kinjo discloses a system configured to determine at least one location of a human face in a color graphic image (column 19, line 18-25), comprising: a color gradient map of the color graphic image configured to indicate true where a color gradient (changing differential values) has a low value (exclude the regions in which differential values change regularly; column 18, line 65 to column 19, line 17); an intensity map of the color graphic image configured to indicate true (white region) where an intensity value has a high value (corresponding to a low pixel density value; column 17, line 33-42). Cosatto (see above discussion of claims 1, 23, and 45) discloses a combined map configured to indicate true where said color gradient map is true and said intensity map is true (information obtained from several channels are combined to find features including shape, color, and motion; column 6, line 20-34), and at least one candidate patch is selected from said combined map, wherein said candidate patches have suitable hue saturation (skin color; column 13, line 14-29).

10. Regarding claim 34, Kinjo discloses an apparatus comprising: a processor (facial-region extracting unit 40) coupled to a memory (ROM) through a bus; and a detection process

(program) executed by the processor from the memory (column 16, line 37-48) to cause the processor to determine a first area of a color graphic image wherein a color gradient (changing differential values) has a low value (exclude the regions in which differential values change regularly; column 18, line 65 to column 19, line 17); determine a second area of the color graphic image (white region) wherein an intensity value has a high value (corresponding to a low pixel density value; column 17, line 33-42). Cosatto (see above discussion of claims 1, 23, and 45) discloses performing a logical AND (combination) on said first area and said second area (information obtained from several channels) to determine a third area of the color graphic image (feature areas including shape, color, and motion; column 6, line 20-34), and selecting portions of said third area with suitable hue saturation (skin color) to form at least one candidate patch (column 13, line 14-29).

11. Regarding claims 2, 13, 24, and 35, Kinjo discloses that determining said first area uses a first threshold value comparison (column 39, line 36-44).

12. Regarding claims 4, 15, 26, and 37, Kinjo discloses that determining said second area (density) uses a second threshold value comparison (column 17, line 33-42).

13. Regarding claims 3, 5, 14, 16, 25, 27, 36, and 38, Kinjo does not explicitly disclose that said first or said second threshold is determined by normalization. The examiner takes Official Notice that determining thresholds by normalization is well known in the art. It would have been obvious to one of ordinary skill in the art at the time the invention was made to determine the predetermined threshold for binarization and differential density values normalization using the average density calculated for the overall image as taught by Kinjo (column 17, line 4-9).

14. Regarding claims 8, 19, 30, and 41, Kinjo discloses fitting an ellipse (elliptical region) to one of said at least one candidate patch (column 21, line 21-28).

15. Claims 6, 7, 9-11, 17, 18, 20-22, 28, 29, 31-33, 39, 40, and 42-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kinjo in view of Cosatto as applied to claims 1, 8, 12, 19, 23, 30, 34, and 41 above, and further in view of Lobo et al. (USPN 5,781,650, previously cited, "Lobo").

16. Regarding claims 6, 17, 28, and 39, neither Kinjo nor Cosatto disclose that said third area is eroded or that said combined map includes an eroded boundary. Lobo discloses a system for automatic feature detection and age classification of human faces in digital images including a face template that is used for oval-fitting by the use of a potential image of an edge where a morphological operator first broadens the image's similar intensity regions, then narrows (erodes) the similar intensity regions in a copy of the image, and finally the narrowed image is subtracted from the broadened image (column 4, line 44-57). It would have been obvious to one of ordinary skill in the art at the time the invention was made to erode similar intensity regions as taught by Lobo in order to remove stray pixels and to isolate edges for detection.

17. Regarding claims 7, 18, 29, and 40, Lobo discloses that said eroding (narrowing) is morphological (column 4, line 49-63).

18. Regarding claims 9, 20, 31, and 42, neither Kinjo nor Cosatto explicitly disclose determining if said ellipse is a bad fit to said at least one candidate patch or that said ellipse includes a degree of fit measure. Lobo discloses an oval fitting operation including iteratively updating the oval center position and the oval axes half-lengths until the total energy stabilizes

around a minimum value and a final fit has been reached (column 5, line 39-48). It would have been obvious to one of ordinary skill in the art at the time the invention was made to determine the degree of fit of an ellipse about a candidate patch as taught by Lobo in order to ensure that the ellipse/oval is properly positioned and scaled to include the optimum amount of information for personnel identification or the like.

19. Regarding claims 10, 21, 32, and 43, Lobo discloses further processing said at least one candidate patch when said ellipse is a bad fit (iteratively update until total energy stabilizes; column 5, line 39-48).

20. Regarding claims 11, 22, 33, and 44, Kinjo discloses determining if said one of said at least one candidate patch is too smooth (column 18, line 54-63).

Conclusion

21. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- USPN 5,631,697 to Nishimura et al. discloses a video camera capable of automatic target tracking including a logical AND operation (column 7, line 13-35).
- USPN 5,859,921 to Suzuki discloses an apparatus for processing an image of a face including a logical AND operation (column 3, line 49-column 4, line 42; column 37, line 5-67; Figures 39-41).
- USPN 6,249,317 to Hashimoto et al. discloses an automatic exposure control apparatus including a logical AND operation (column 24, line 63-column 25, line 12).

- USPAP 2001/0044818 to Liang discloses a system and method for identifying and blocking pornographic and other web content on the internet including a logical AND operation (page 3, paragraph 59-61; Figure 7).
- USPN 6,542,625 to Lee et al. discloses a method of detecting a specific object in an image signal including a logical AND operation (column 5, line 4-21).

22. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ryan J Hesseltine whose telephone number is 703-306-4069. The examiner can normally be reached on Monday - Friday, 8:30 AM - 5 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on 703-308-6604. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

rjh
March 30, 2004

JINGGE WU
PRIMARY EXAMINER